



California Energy Commission

California Energy Demand (CED) 2013 Revised Baseline Electricity and Natural Gas Forecasts

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Agenda

- Statewide baseline forecast
- Climate change and extreme temperatures
- *CED 2013 Revised* energy prices
- Self-generation
- Additional achievable energy efficiency and adjusted forecasts
- EV and NGV forecasts
- Planning area forecasts



Presentation

- Methodology
- Statewide results
- Updates/revisions vs. *CED 2011* and preliminary forecasts
- Committed efficiency
- *CED 2013 Revised* vs. econometric forecast
- Climate change



Forecast Planning Areas (electricity)

- Burbank/Glendale
- Imperial Irrigation District
- LADWP
- Pasadena
- PG&E (PA and service territory)
- Southern California Edison (PA and serv. ter.)
- SDG&E
- SMUD



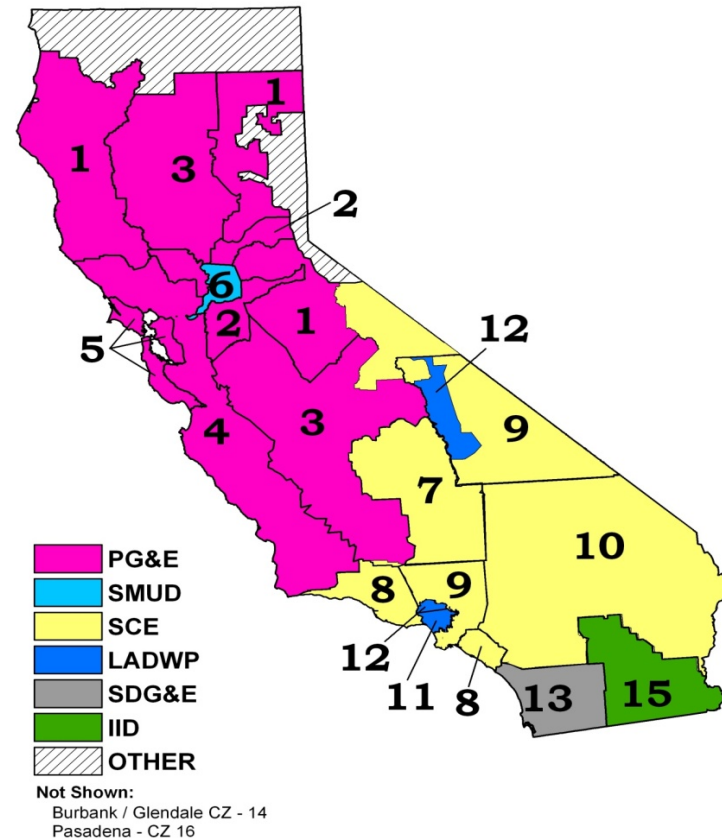
Forecast Planning Areas (end-user natural gas)

- PG&E
- Southern California Gas (PA and service territory)
- SDG&E
- Other



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16 Climate Zones





Forecast Models

- Residential (end use)
- Commercial (end use)
- Industrial (hybrid end use-econometric)
- Agricultural (disaggregate econometric model)
- Transportation, communications, and utilities; street lighting (disaggregate trend analysis)
- Summary and Peak models
- Predictive models for self-generation



Econometric Models

- Separate models for all sectors, electricity and gas, except TCU gas
- Peak model
- Used to inform, to make adjustments, and as point of comparison



What's New vs. *CED 2011*

- New industrial model
- New econometric models, old models re-estimated
- Climate change impacts for both peak and consumption (electricity and natural gas)
- New efficiency programs and standards
- Climate zone analysis
- Predictive model for commercial CHP and PV



Three Scenarios

- High Demand: higher economic and demographic growth, lower efficiency program impacts, lower rates, higher climate change impacts
- Low Demand: lower economic and demographic growth, higher efficiency program impacts, higher rates, no climate change impacts
- Mid Demand: in between high and low



Key Inputs

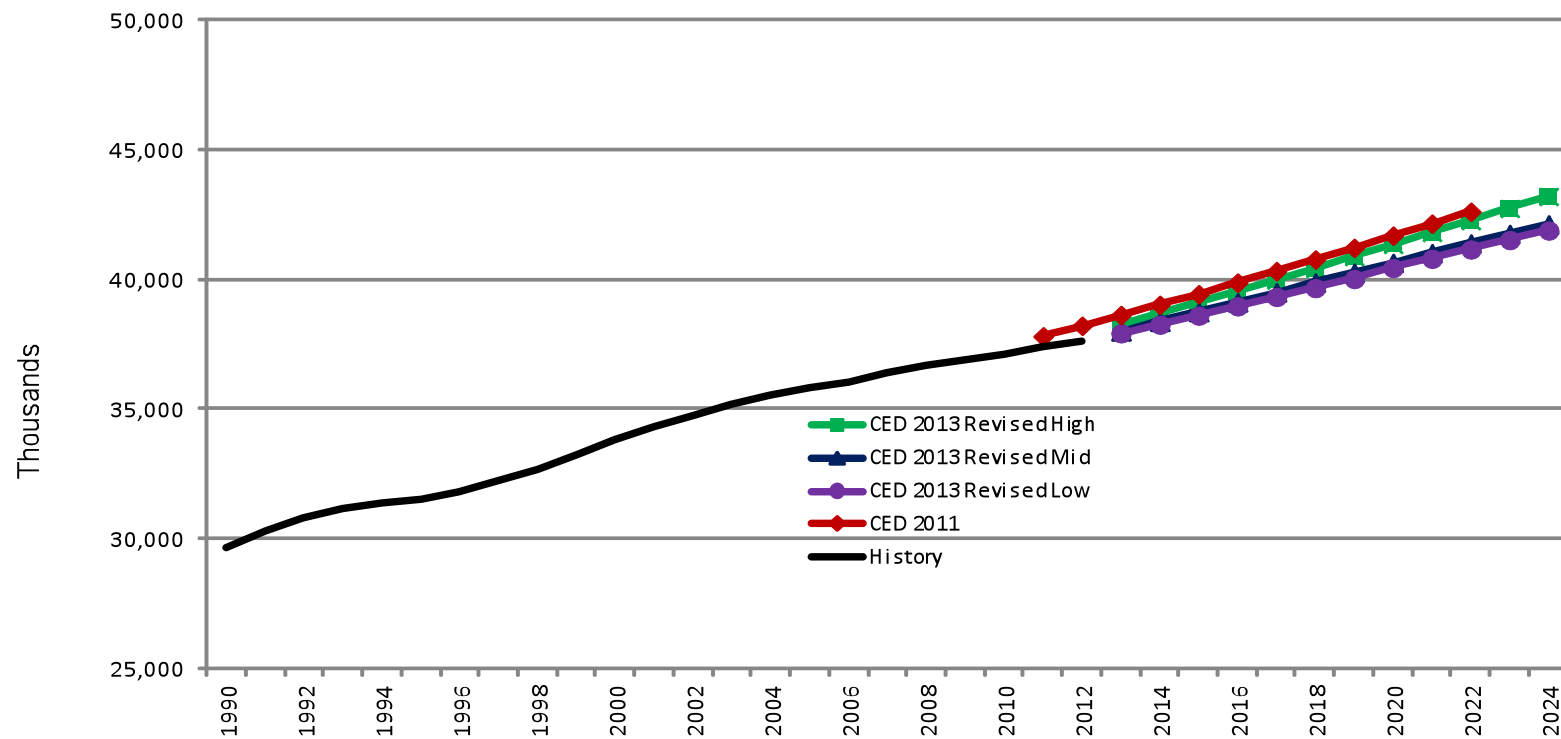
- Population
- Average household size
- Employment
- Personal income
- Manufacturing output
- Commercial floor space (derived from economic/demographic data)
- Rates



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Population Projections

Mid and low cases almost identical

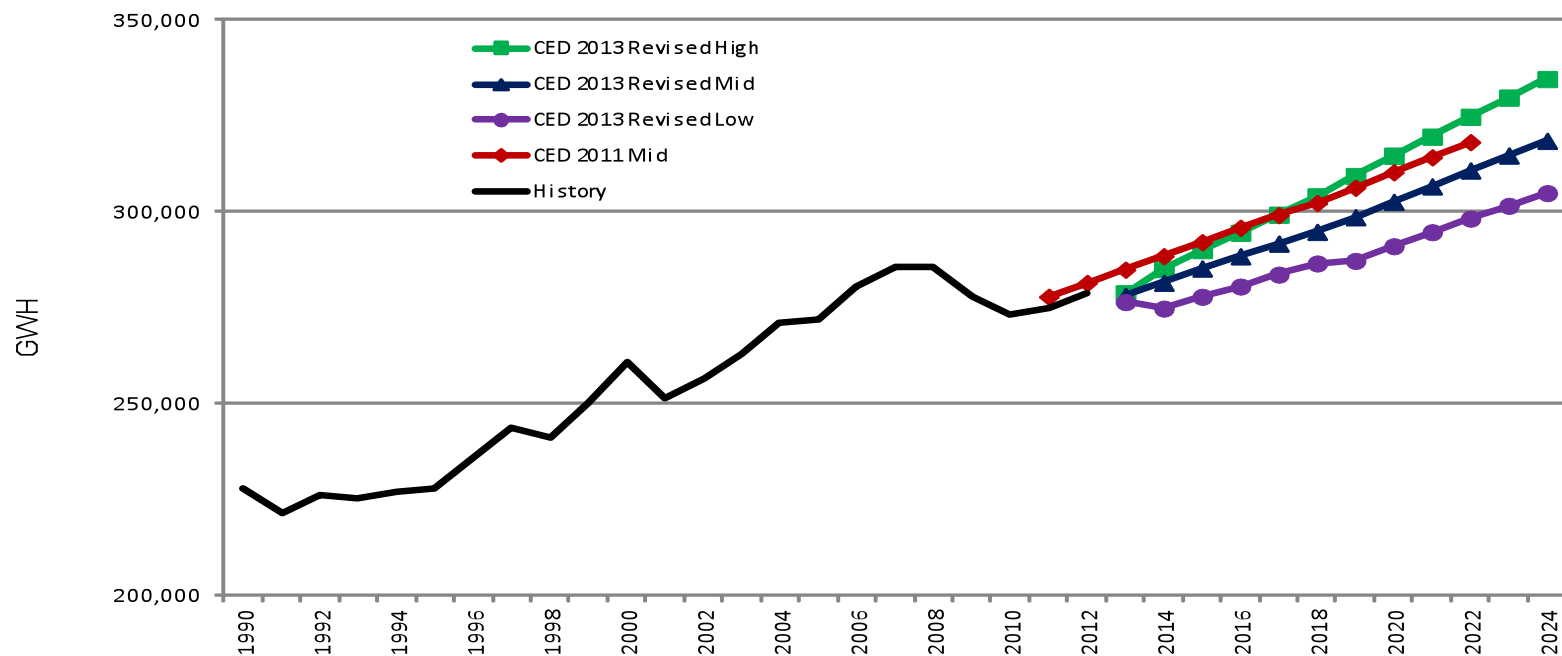




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Statewide Baseline Electricity Consumption: *CED 2013 Revised* vs. *CED 2011 Mid*

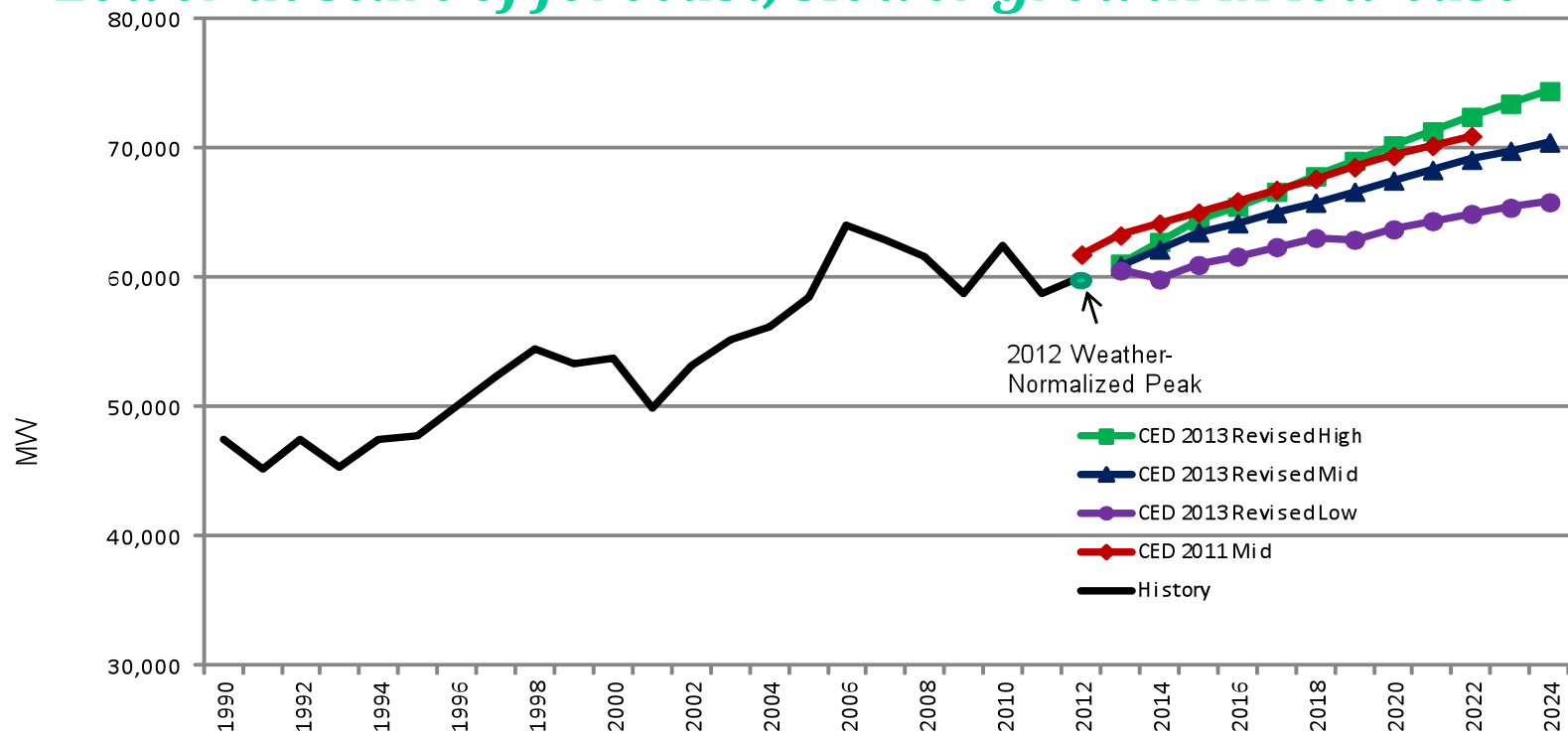
Lower at start of forecast, faster growth in high case





Statewide Electricity Peak Demand: *CED* *2013 Revised vs. CED 2011 Mid*

Lower at start of forecast, slower growth in low case





Statewide Electricity Consumption and Peak Demand

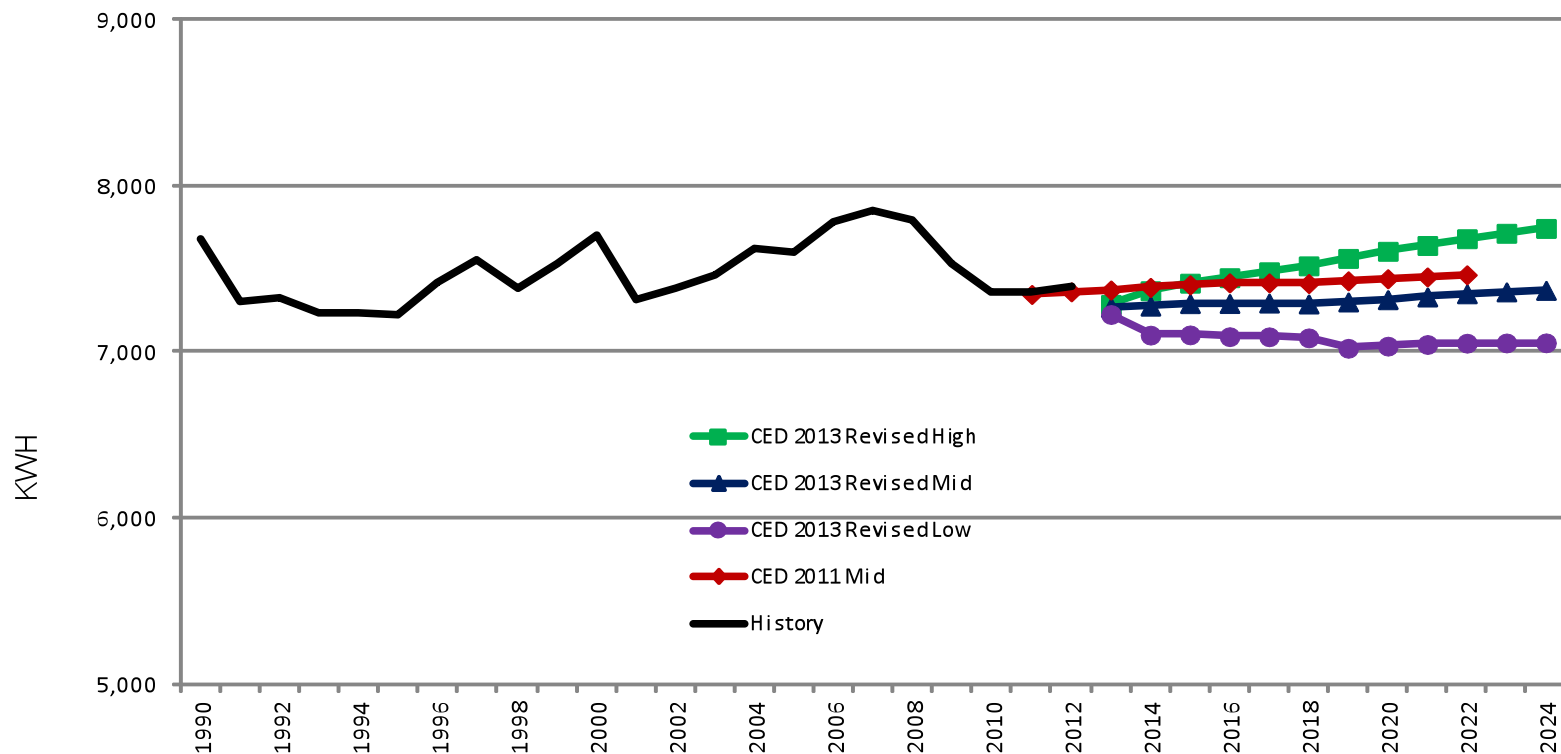
- Flat growth from 2012-2013
 - IOU 2013-2014 efficiency programs, POU 2013 programs
 - Historically high cooling degree days in 2012 (consumption)
 - Little growth in GSP/personal income



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Electricity Consumption per Capita

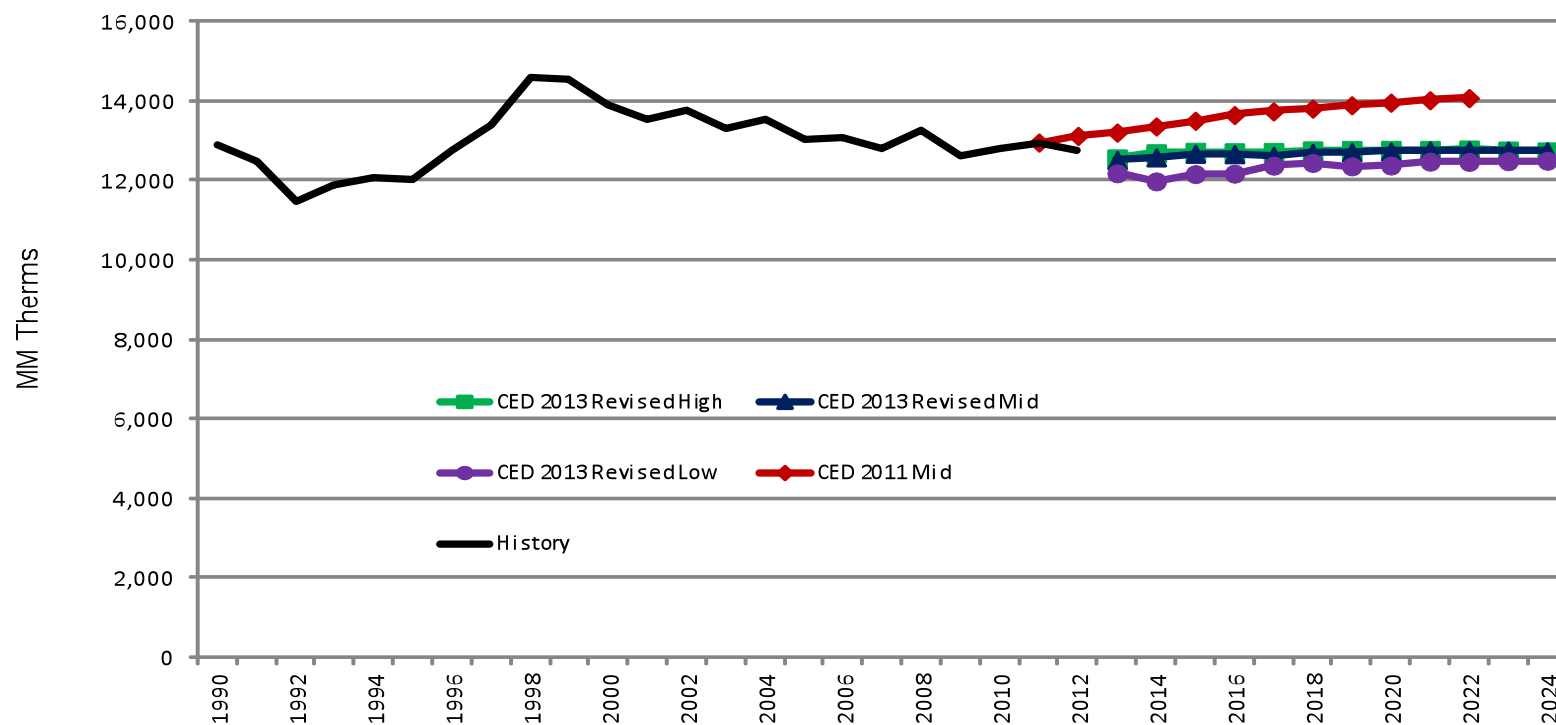
Declines from 2012 to 2013, EVs push later increase





End-User Natural Gas Consumption

Reduced cooling, projected increasing NG prices contribute to flat growth





Changes vs. *CED 2013 Preliminary*

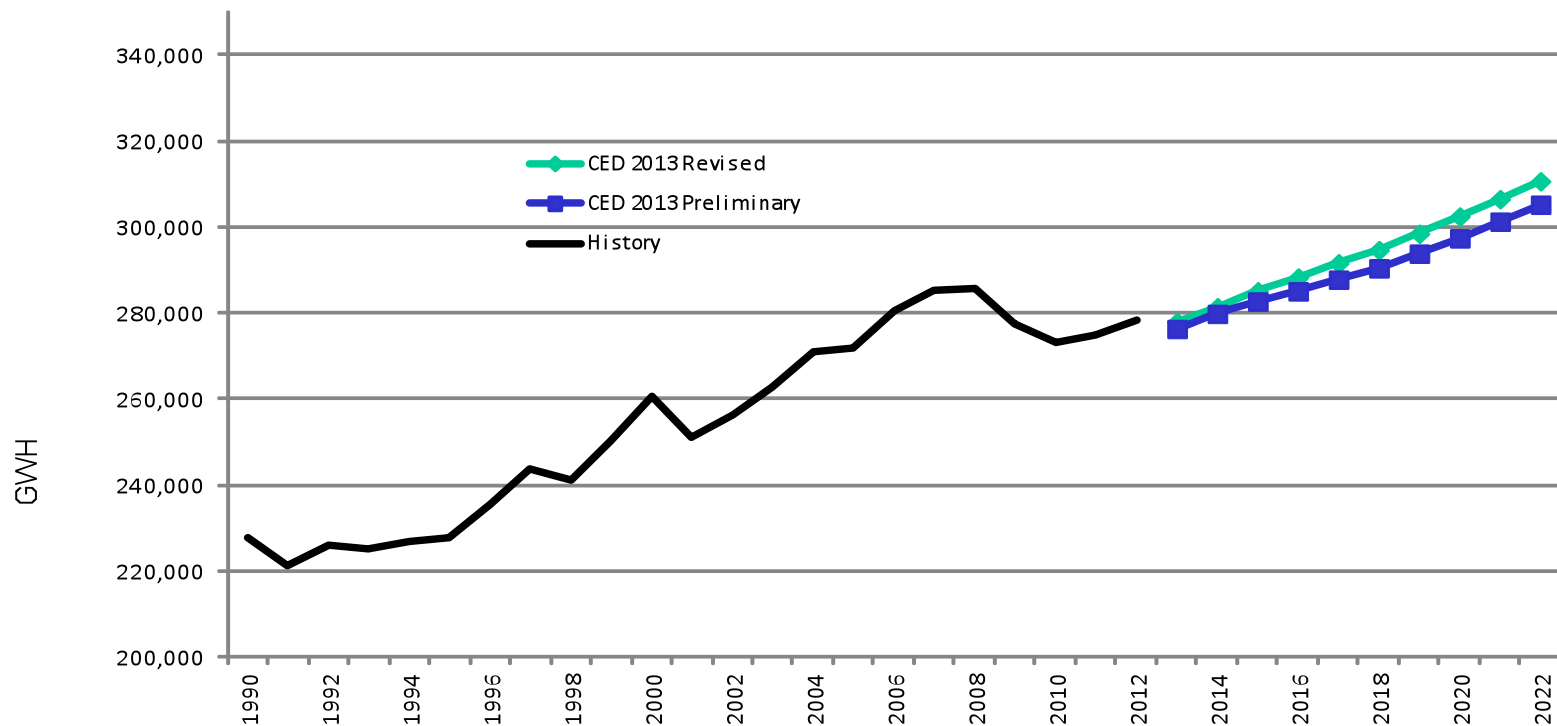
- Updated economic/demographic forecasts
- Lower prices (electricity)
- Port electrification and high-speed rail
- Possibly new EV forecast and additional electrification (e.g. truck stops) by time of adoption
- Commercial PV predictive model
- CPP and PTR demand response programs



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Statewide Electricity Consumption

Revised forecast mid case 1.8% higher than preliminary mid case by 2024

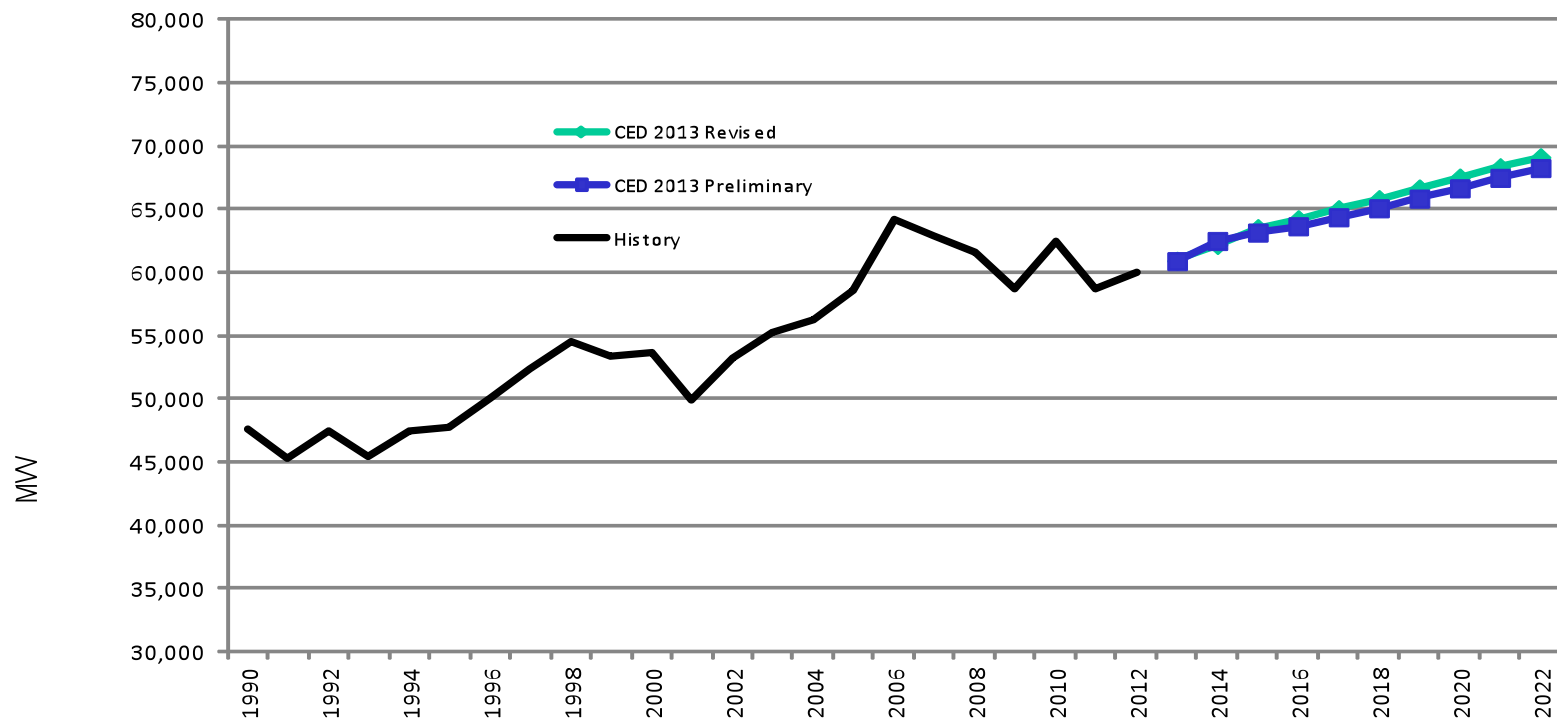




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Statewide Electricity Peak Demand

Revised forecast mid case 1.2% higher than preliminary mid case by 2024





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DR Impacts: CPP and PTR (MW)

Also, 37 MW from non-event based DR by 2024

Year	PG&E	SCE	SDG&E
2012	47	53	19
2013	39	38	21
2014	46	25	39
2015	69	25	39
2016	80	25	40
2017	112	25	40
2018	107	25	41
2019	108	25	42
2020	108	25	42
2021	109	25	43
2022	109	25	43
2023	110	25	44
2024	110	25	44



High-Speed Rail Impacts (GWh)

Year	PG&E	SCE	Total
2022	93	35	128
2023	155	58	213
2024	162	61	223



Port Electrification Impacts (GWh)

		High	Mid	Low
LADWP	2015	47	46	46
	2020	85	76	66
	2024	103	84	66
PGE	2015	56	55	55
	2020	91	81	71
	2024	109	90	71
SCE	2015	46	45	44
	2020	76	68	60
	2024	92	76	60
SDGE	2015	13	13	13
	2020	16	14	13
	2024	19	16	13
Total	2015	161	159	157
	2020	268	239	211
	2024	322	266	211



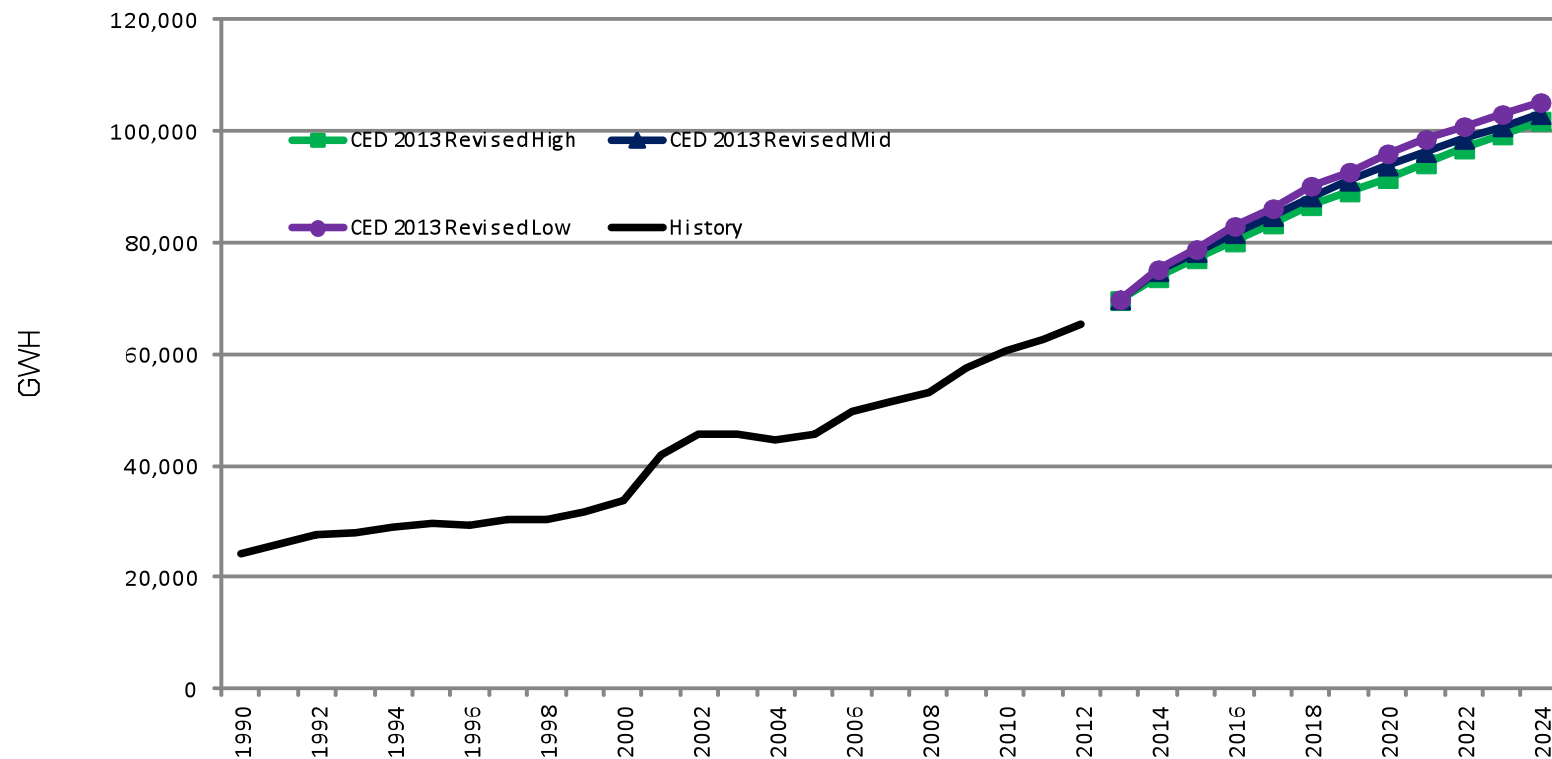
Committed Efficiency

- Funded and approved programs
- Finalized and/or implemented standards
- Price effects



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Committed Efficiency Savings *Relative to a "counterfactual" back to 1975*

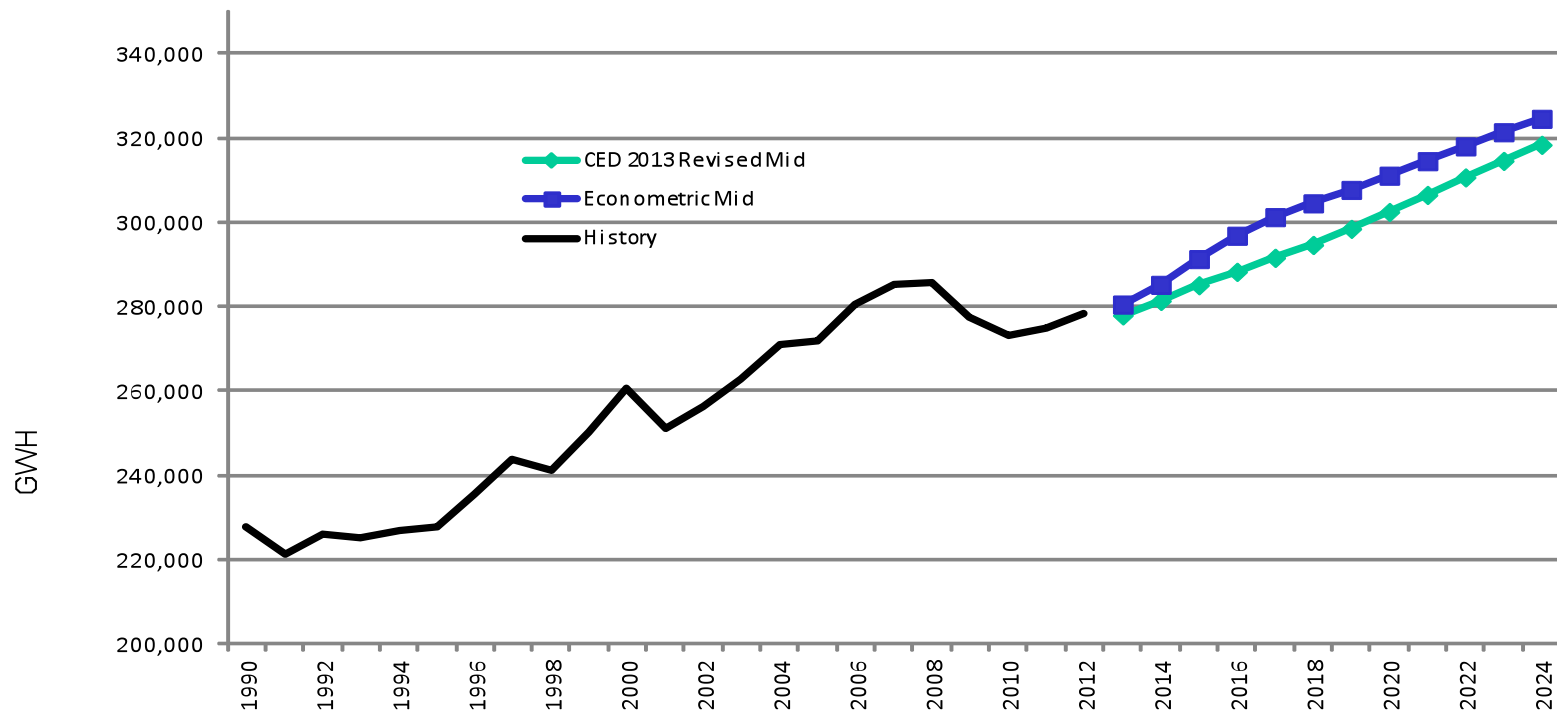




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CED 2013 Revised vs. Econometric Forecast: Statewide Consumption

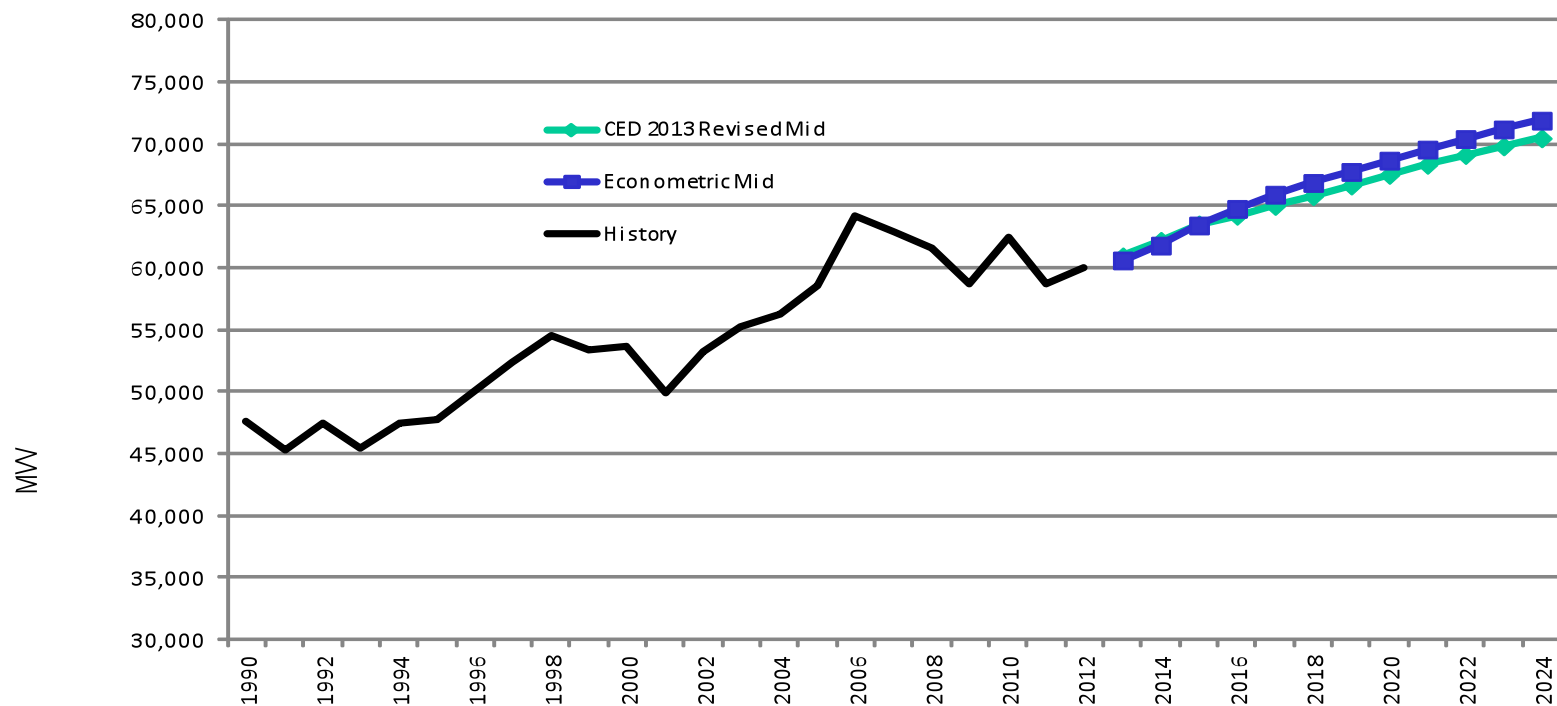
Econometric 1.9% higher in 2024





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CED 2013 Revised vs. Econometric Forecast: Statewide Peak *Econometric 2.0% higher in 2024*

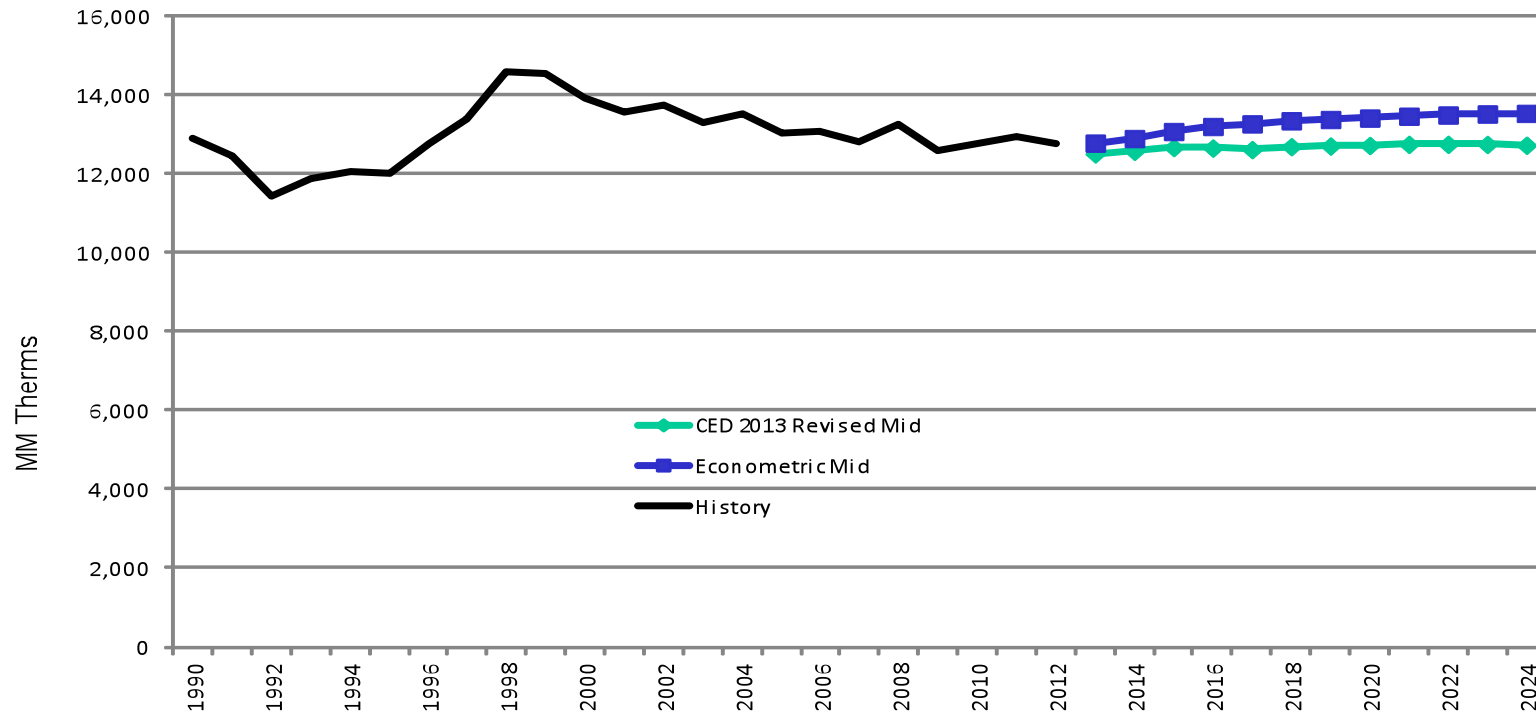




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CED 2013 Revised vs. Econometric Forecast: Natural Gas Consumption

Econometric 6.3% higher in 2024





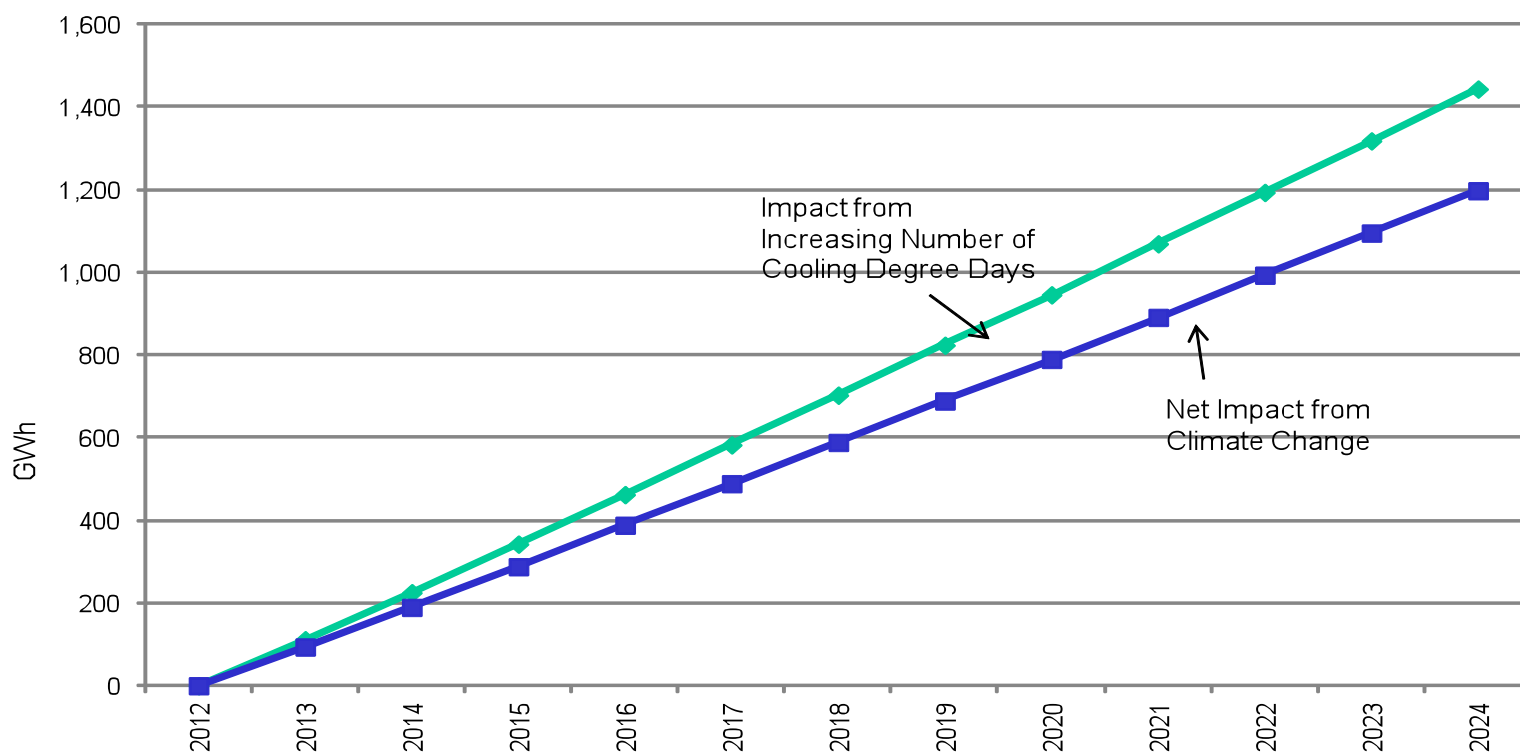
Climate Change Impacts

- Based on Scripps Institute of Oceanography scenarios using 10 climate change models
- Electricity consumption impacts estimated through changes in cooling and heating degree days
- Natural gas consumption impacts estimated through changes in heating degree days
- Peak impacts estimated through changes in annual maximum daily average temperatures



Climate Change: Electricity Consumption Impacts, Mid Case

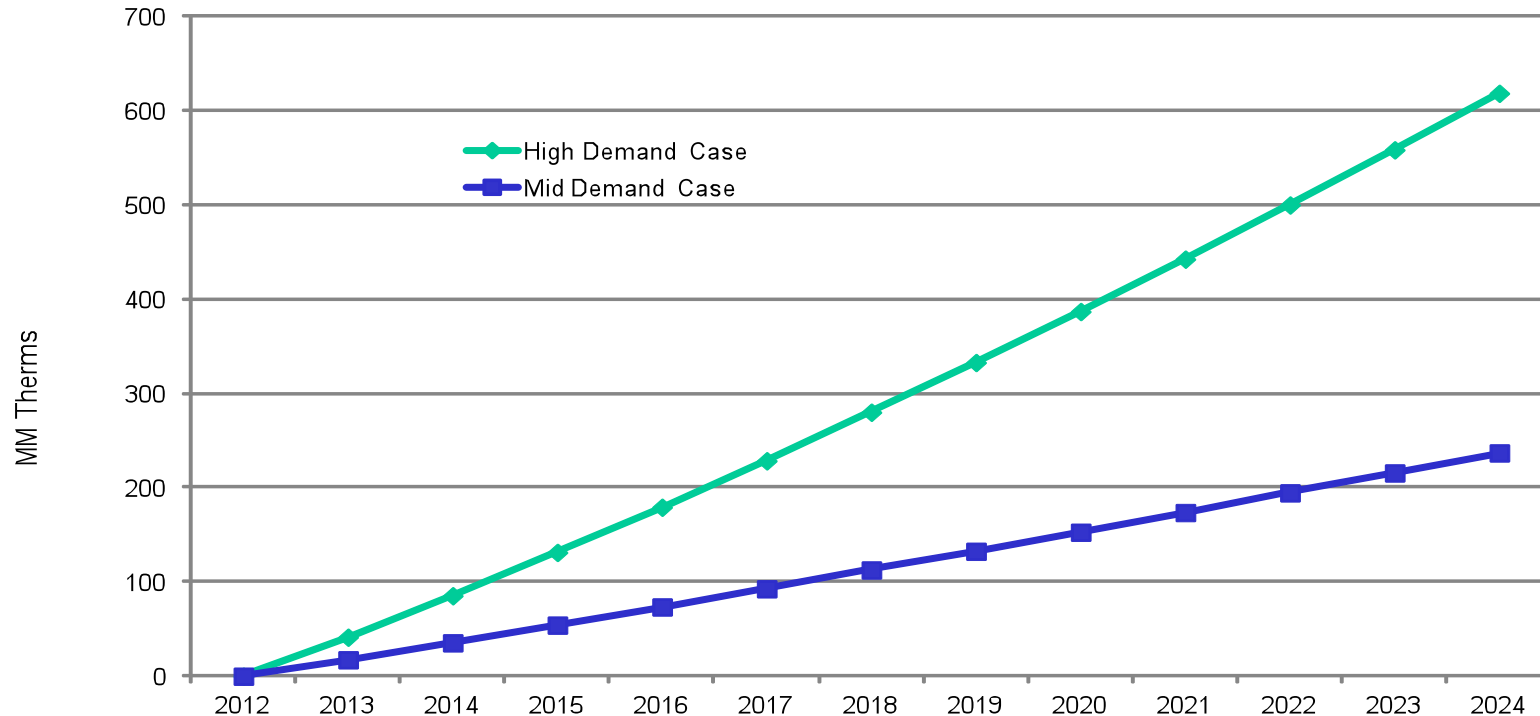
2,300 GWh and 1,700 GWh in High Case, 2024





Climate Change: Natural Gas Consumption Impacts

Higher percentage impact vs. electricity consumption





Climate Change: Peak Demand Impacts

Around 1,000 MW and 1,600 MW statewide in 2024

		Annual Maximum Average ⁶³¹ (°F), Mid Demand Scenario	Annual Maximum Average ⁶³¹ (°F), High Demand Scenario	Peak Impact, Mid Scenario (MW)	Peak Impact, High Scenario (MW)
LADWP	2015	83.8	84.0	21	37
	2020	84.3	84.8	61	107
	2024	84.6	85.4	95	169
PG&E	2015	86.0	86.1	83	123
	2020	86.4	86.7	239	360
	2024	86.8	87.3	377	569
SCE	2015	86.0	86.2	78	121
	2020	86.5	86.8	225	358
	2024	86.8	87.4	355	570
SDG&E	2015	78.2	78.4	16	28
	2020	78.6	79.0	45	82
	2024	78.9	79.6	72	131
SMUD	2015	85.4	85.6	7	17
	2020	85.7	86.3	21	50
	2024	85.9	86.8	33	80
State	2015	--	--	209	334
	2020	--	--	604	982
	2024	--	--	950	1,559



Future Forecast Work

- Hybrid econometric/end-use models
- Further disaggregation/granularity
- Climate change and temperature distributions (1 in 2 vs. 1 in X peak demand)
- Load shape impacts from demand-side policy